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EDITORIAL NOTES

NATIONAL FUEL ADVISORY COUNCIL

IT was in February of this year that the Minister of Fuel and Power decided to set up a National Fuel Advisory Council. Fuel technologists had for long advocated the establishment of an advisory body to deal on the broadest lines and without bias with the general fuel question, and aid in the formulation of a fuel plan in the best interests of the nation and the community. Last week Major Lloyd George announced the constitution of the Council and also its terms of reference, which are "to consider and advise upon questions, referred from time to time by the Minister to the Council, concerning the development and utilization of the fuel and power resources of the country in the national interest." Also this year (in June), as part of the composite scheme of investigation, the Minister of Fuel appointed a Committee of Enquiry into the Gas Industry, with terms of reference widely drawn to cover every conceivable phase of the Industry's work, which Committee is receiving evidence. The Minister also made call upon the electricity industry. Already a considerable amount of evidence must have been garnered and sorted. As we have said, the Advisory Council's terms of reference are on the broadest of lines, and we have, of course, no knowledge of what questions the Minister of Fuel may from time to time put to the Council for its advice. But in view of the long-time advocacy of the Gas Industry of an all-embracing fuel plan maintaining a balance between conservation of resources and the health, comfort, and freedom of the people, is it too much to hope that this matter—which throughout, as our columns testify, has seemed to us fundamentally important—will be considered appropriate for survey and recommendation by a dispassionate Advisory Council?

The constitution of the Council is given on a later page. We think the names are such as to inspire every confidence.

CHEMICAL AND PAINT CONTROLS

ACCUSTOMED as it has always been to operating under legislative restrictions of many sorts, the Gas Industry has, on the whole, adapted itself well to the controls that have been necessitated by wartime conditions, and as one of the nation's largest chemical producers it has more than passing interest in the recently issued report of the Select Committee on National Expenditure on "The Chemical Controls." The five Chemical Controls (three of which, covering sulphuric acid, fertilizers, and industrial ammonia, are of direct concern to the Industry) form a group within the 29 Raw Material Controls administered by the Ministry of Supply. Because of the close connexion between them, the five controllers form a board, whose chairman is responsible for co-ordinating their activities, and, in the words of the report, "the controls are the hands, eyes, and ears of the Raw Materials Department, and the controllers do everything but control." The report, it should be noted, does not cover the Coal Tar Control, which, because of its closer association with fuel, comes under the Ministry of Fuel and Power. Though attention is drawn to the fact that the Chairman of the Chemical Control Board is a Director of the largest chemical company in the country, and three of the chemical controllers are Directors of companies engaged in that branch of the chemical industry with which they are still concerned, the Committee is entirely satisfied that private trade interests have in no way conflicted with the performance of official duties. On the other hand, the controllers of industrial ammonia and sulphuric acid, who are respectively former officers of the corresponding trade associations, bring to bear on their duties as far as possible the policy of their associations. It was a condition of all the appointments that the persons concerned should cease from any active participation in any business connected with the trade or with the materials dealt with by the control.

The main recommendation in the report is that the whole organization of the Chemical Controls should be reviewed, and consideration given to the advantages of absorbing them into the headquarters of the Raw Materials Department. Much as it looks forward to a loosening of the reins, the Gas Industry would, we believe, regard such an absorption with misgiving, lest it placed the control of its chemical operations in the hands of officials less well informed in the affairs of the particular department. A more acceptable plan would be to assemble the controls of all the Gas Industry's products in a single group. The reasons given in the report for the recommendation are that the burden of the work has diminished, the supply position is less difficult, and the machinery of distribution, licensing, and so forth has become stereotyped. "Apart from the economies of staff and premises likely to result from such a reorganization," it says, "there would be positive advantages in knitting more closely together the organization for dealing with materials, whose manufacture and uses are so intimately connected as are those of sulphuric acid, industrial ammonia, and fertilizers."

Criticism has been levelled at the controls, but much of it has arisen from ignorance of the true position within the Governmental organization—a state of mind which is perhaps encouraged by the title "controller" with its suggestion of dictatorial powers. The Select Committee has, however, received specific allegations mainly regarding the operation of one or two controls, falling under four heads: (*a*) that existing capacity has not been fully used; (*b*) that new capacity has not been distributed to the greatest advantage; (*c*) that technical skill and facilities for research and development have not been sufficiently widely drawn upon ; and (*d*) that attempts to concentrate the paint industry have not been properly carried out.

The operation of the Chemical Controls, says the report, has tended to strengthen the preponderance of the strongest interests in the chemical industry. Though it is undeniable that the vast resources of the interests in question have been of the greatest service in the national effort, there is a danger that too much reliance may be placed on the strength of a single concern. This concentration of resources makes difficult the control of costs by the department, since in the case of many products there is no standard of comparison and overheads are difficult to calculate. These sentiments are shared by the Gas Industry, whose main criticism of the controls is that their price-regulating machinery has not always kept pace with the changing circumstances of production. Whether or not the time lag which has from time to time left the chemical departments with little or no profit will operate to their advantage when costs start on the downward grade remains to be seen. While most things are controlled, there still does not appear to be adequate regulation of spent oxide.

The enquiry, concludes the report, has not brought to light much that calls for specific criticism, but it is recommended that "a large volume of complaint from one firm in particular should be referred to a properly qualified tribunal with power to hear parties by counsel."

A large section of the Select Committee's report deals with the paint industry, the treatment of which, it considers, has not been satisfactory. A scheme to concentrate the industry in

200 nucleus works and close down 250 to 300 smaller works was proposed in 1942, and abandoned after protests from the firms that were to be closed. Last year new lists were prepared comprising 187 firms which needed protection for their labour in order to satisfy the requirements of the purchasing departments, and so far as the Ministry of Supply was concerned, the Ministry of Labour was free to take all the labour from the rest. After protests by the excluded firms, an assurance was given by the Ministry of Labour that no small firm would be compelled to close, and that all firms would be allowed to retain their key men. In the event, no small firm has actually been closed, and the withdrawal of labour from all firms, large and small, has been considered by the Man Power Boards, each case on its merits and on similar principles.

The Select Committee records, however, that firms not on the lists, which were in the main small firms, were discriminated against in regard both to the protection of their labour and to their obtaining of Government orders. Direct orders for paints, other than certain special kinds, are no longer to be limited to firms on the lists, and thus one objection is removed. But the continued existence of the lists still results in discrimination between firms in regard to labour, and the Committee recommends that the lists should be abandoned. The fulfilment of this recommendation would enhance the industry's feeling that it is getting a better deal. On the whole the paint manufacturers share the sentiment of the Gas Industry that it would be better to keep the Chemical Controls as a separate group than to merge them completely in the Raw Materials Department.

FLEXIBILITY IN THE COAL INDUSTRY

IT would seem to be generally recognized that there are technical problems to be solved in the economic winning of coal. There are, we think, about 2,000 collieries, each with its own peculiar problems and working coal differing in quality, thickness of seam, and depth from surface. It has been argued fiercely and persistently that nationalization and nationalization only of the mines can hope to increase technical efficiency, lower costs of production, and reduce the great disparity between pithead price and the price the consumer has to pay for his coal. With such a wide divergence of technical problems flexibility rather than rigidity of attack seems to be called for. To our mind consumers of coal, industrial or domestic, are concerned not primarily with political issues or with arguments for and against national or private ownership, but with being able to obtain at an economic price the quality of coal they need. We have no doubt that, as a class—a class, by the way, numbering many millions, yet who seem to have no voice in the matter—they are anxious to ensure that the miner is paid adequately in relation to his arduous, hazardous, and uncomfortable labour. We think also they have a right to expect supply of the coal which the nation needs, and we know that many consumers who have to earn their own living by hard thinking have scant faith in nationalization, *per se*, as a means of increasing the necessary technical flexibility to which we have referred.

The overriding need, of course, is to ensure sufficient supply of coals of the right quality at a reasonable price, and there seems little doubt that improvement in technical efficiency could do much in both directions. But while all this argument about national *versus* private ownership is going on with such fervency (and a correspondent to *The Times* last week stated that if all net profits were in fact available for price reduction, the possible reduction would not amount to more than about 6d. a ton), prices are soaring and supplies are decreasing. This entirely apart from the allocation of the right coals for particular purposes and from the question of ash content, which has to be paid for directly and indirectly. The story is indeed a sorry one; nobody can be proud of it. Statistics issued last week by the Ministry of Fuel and Power emphasize the gravity of the situation. There have been a national wages agreement, a national agreement for holidays with pay, increased rates for overtime and week-end work, stabilized war wages till 1948, and the merging of miners' district organizations into one big union. The result? The more imperative the demand for coal, the greater the drop in production. Compared with the first quarter of this year, the second quarter showed a drop in coal production for sale of 1,159,300 tons. In 1941, with over 10,000 fewer wage earners in the coal industry, the output of saleable coal was 12,000,000 tons greater than in 1943. It is estimated that this year there will be a production drop of about 10,000,000 tons compared with 1943. The decreased output of 1,159,300 tons of coal in the second quarter of this year is more disheartening when it is realized that open-cast production jumped from 1,412,700 tons in the first quarter to 2,322,800 tons. On the occasion of every increase in pay to the miners the public has been led to believe that the miners would increase production; but production has gone steadily down. This would appear to be an inflexible element in an industry which calls for flexibility.

Personal

Alderman G. PICKUP, for 25 years Chairman of the Darwen Gas Committee, has resigned from Darwen Town Council after a total of 35 years' membership.

* * *

Mr. A TOWNLEY has, for personal reasons, resigned his position as Managing Director of the Underpressure Engineering Company, Ltd., and Mr. W. C. MARTIN, late Chief Assistant Engineer to the Province of Buenos Ayres Waterworks Company, Ltd., has been appointed Manager in his place.

* * *

Mr. ALBERT FIELD, Northern Sales Representative of Cannon Iron Foundries, Ltd., for the past 40 years, will retire at the end of the year, after a total of 48 years' service with the Company.

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The marriage took place at Manchester on Nov. 16 of Mr. D. K. GREEN, Engineer and Manager of the Leek Gas Department, to Miss MARY TOMLINSON, only daughter of Mr. T. A. Tomlinson, Chief Engineer to Messrs. West's Gas Improvement Company, Ltd.

Obituary

Mr. HENRY BUTT, J.P., Chairman of the Weston-super-Mare and District Gas Company, died on Nov. 7. Mr. Butt joined the Board in 1923, was appointed Deputy-Chairman in 1931, and became Chairman in 1933.

Fuel and Power Advisory Council

Major Lloyd George has announced the constitution of the Fuel and Power Advisory Council. The members are:

Sir Ernest Simon, M.Inst.C.E., M.I.Mech.E. (Chairman); Mr. Geoffrey Crowther; Sir John Greenly, K.C.M.G., C.B.E., M.I.Mech.E., M.I.E.I.; Dr. E. S. Grumell, C.B.E.; Sir Harold Hartley, K.C.V.O., C.B.E., M.C., F.R.S.; Professor C. N. Hinshelwood, F.R.S.; Professor John Jewkes, C.B.E.; Viscount Ridley, C.B.E.; Sir Robert Robinson, F.R.S., D.Sc.; and Mr. Geoffrey Summers, C.B.E. Secretary, Mr. R. N. Quirk.

The terms of reference are: "To consider and advise upon questions referred from time to time by the Minister to the Council, concerning the development and utilization of the fuel and power resources of the country in the national interest."

Diary

Nov. 24.—London and Southern District Junior Gas Association: Gas Industry House, 6.30 p.m.

Nov. 25.—Western Junior Gas Association: Meeting at Weston-super-Mare, 2.30 p.m. Paper by J. R. Martindale (Bristol).

Nov. 30.—Eastern Counties Gas Engineers' and Managers' Association: Autumn Meeting, Gas Industry House. Papers by Dr. J. G. King and Dr. F. J. Dent.

Dec. 5.—Domestic Heat Services Committee: Gas Industry House, 2.30 p.m.

Dec. 13.—Southern Association of Gas Engineers and Managers (Eastern District): Gas Industry House, 2.30 p.m. Paper by C. A. Deas, "Horizontal Retort House Operation and Works Power Supply."

The fact that goods made of raw materials in short supply owing to war conditions are advertised in the "Journal" should not be taken as an indication that they are necessarily available for export.

Nationalization and Private Enterprise

In his Presidential Address to the British Waterworks Association, Mr. A. B. E. Blackburn, Director, Engineer, and General Manager of the Sunderland and South Shields Water Company, said:

There is far too much nonsense talked about public utility companies working for private profit. It would be truer to say they work so as to make ends meet; for whether company-owned, municipally-owned or nationally-owned, all water undertakings have to pay their way—the interest on the capital cost of their works and the running and maintenance costs. The criterion on which they should be judged, as the White Paper of the Government admits, is the efficiency with which they serve the public need.

What other motive but that of efficiency can animate undertakings, adequately staffed with properly qualified technical men and administrators, in view of the fact that Parliament, in the interests of the public, takes every care to limit the water charges, the interest payable on money raised, and the sums which may be put to reserve funds or carried forward each year? What other industry can say that it collects, stores and delivers into the house of every consumer the commodity it supplies for something of the order of 3½ pence per ton (one shilling and three pence per 1,000 gallons)?

There are some who assert that the only solution worth putting on the statute book is complete nationalization of water sources and supplies, but would nationalization benefit the water consumer or lead to efficiency in control? Would it not stifle initiative, lead to endless delay in getting work done, and to much waste and incompetence? Nationalization may be right in the eyes of political theorists, but we in the water industry already have an edifice built up with much care, labour and local pride during the last 100 years. In the matter of water supply, it is not possible to start at this date *ab initio*.

There is much to be said for the formation of larger undertakings by the merger of small undertakings, and for a measure of regionalization, but a great deal against the soul-destroying effect of nationalization and reference of everything to Whitehall. Who is there among the heads of Local Government Services that has not experienced delay and a sense of frustration in dealing with officials of Government Departments, a class of men exercising almost the power of dictators with regard to schemes without the remotest responsibility for carrying them out? The whole system of Government machinery is inadequate to cope with planning and the needs of a post-war world. It is too cumbrous, unimaginative, lacking in initiative and seemingly unable in normal times to enlist on its permanent staff technical men with wide knowledge and management experience, who should take a leading part in shaping general policy and simplifying legislation.

Most of us are concerned with regard to the immediate future and the difficulties of maintaining adequate water supplies. Nearly all undertakings during the war years have experienced an increasing consumption of water and have been prevented from constructing new works to meet the demand. Consequently, when the war ceases there will inevitably be a spate of new works to be put in hand and carried through to completion in the shortest possible time.

In the opinion of those best able to judge—our leading industrialists—there will be three periods facing us:

(1) The period when war contracts cease and manufacturers have to change over to peacetime work—a period when production must inevitably be slow and very expensive.

(2) A period when industry will be unable to cope with the work required and competition to get orders fulfilled will be intense. During this period there will necessarily have to be some tribunal to decide priority of work, and it is impossible to judge how long this period will last.

(3) At some time in the future industry may be in a position to overtake arrears and supply will exceed demand.

One of the first essentials for industry and for those who live by it is a pure and ample water supply, so that new waterworks must obviously stand high, if not first, in the priority list. It will not be possible for many water undertakings to wait for the third period, when no doubt works will be cheaper to construct. There is urgent need for the appointment by the Government of an able and impartial Priority Tribunal if delays and disappointments are to be avoided, and such a tribunal should not be tied to any particular Government Department or have to refer from one Department to another. After the war the sooner the multitude of S.R. & O's. can be materially reduced the earlier shall we be enabled to overtake the arrears of work staring us in the face. The relaxation of the Treasury ban on new issues of capital is one of the most important and pressing controls to be dealt with.

There is a strong and growing feeling against any post-war system involving a large measure of control by Government Departments. The public utility services have given yeoman service during the war, and are, with few exceptions, capable of meeting any reasonable demands made on them, but only if there is a minimum of interference from Government Departments. It cannot be too widely broadcast that whatever the costs of the public services, such as water, gas, electricity, transport, &c., may be, they have to be paid for either (and properly) by the people who want them or by somebody else. It is common knowledge that most people do not appreciate the value of things unless they do pay for them themselves.

I have previously alluded to the cost of water being low relative to the price of other commodities essential to modern standards of living, and one reason for this is that the money for constructing the works has been raised on terms favourable to the consumer. To illustrate this I need only state that in the case of my own undertaking the net yield to the investor on the stocks and loan capital for the year 1943, after payment of income tax, was less than 2½%.

National Gas Council

A Meeting of the Central Executive Board of the National Gas Council was held at Gas Industry House on Nov. 14. Mr. Frank H. Jones presided.

The draft Evidence to be submitted on behalf of the National Gas Council to the Committee of Enquiry into the Gas Industry was carefully considered and approved as amended.

A report on the general coal position was received.

It was reported that pursuant to the previous requests of the Conjoint Conference that the Coal Controller should receive a deputation in order to discuss questions relating to the price and quality of coal, the meeting took place on Oct. 25, when every aspect of the subject was fully discussed. Mr. Sylvester (Chairman of the Council of the Conference), who, accompanied by Colonel Bywater and Mr. Ogilvie, had represented the Gas Industry on the deputation, gave the Board an account of the proceedings.

A report was received from the Chairman, Mr. A. E. Sylvester, on the meeting of the Gas Advisory Committee to the Ministry of Fuel and Power held the previous day, when the matters discussed had included that of purchase tax on gas cookers and other gas-burning apparatus; the removal of restrictions on the supply of appliances, and the position regarding labour and material; publication of accounts and blackout at gas-works.

From a report which had been circulated to members it was seen that the Gas Legislation Committee had carefully considered all the various points raised by members, and the Committee had set out their views with regard to each of such points. The report, subject to certain amendments, was approved.

Dr. E. V. Evans, Chairman of the Council of the British Gas Federation, said that the Council of the Federation at their meeting that morning had agreed to ask the National Gas Council and the British Commercial Gas Association each to nominate five members who would form themselves into a committee for the purpose of evolving machinery with the object of co-ordinating utilization and development work of the Gas Industry throughout the country, and particularly to strengthen the District Organizations in dealing with matters of supply and service. The Board nominated the following representatives to serve on such a committee: Mr. Fras. C. Briggs, Col. W. Moncrieff Carr, Dr. E. V. Evans, Mr. A. E. Sylvester, and Mr. S. E. Whitehead.

The following representatives were reappointed to serve on the Council of the Federation for the year commencing Jan. 1, 1945: Messrs. J. R. Bradshaw, F. H. Jones, C. S. Shapley, A. W. Smith, and A. E. Sylvester.

It was stated that the Annual General Meeting of the British Gas Federation had been arranged to take place on Dec. 12, at the conclusion of the meeting of the Central Executive Board. The business of the meeting would be entirely formal, as war conditions still prevailed, and would be restricted to members of the Council.

The following representatives were reappointed to serve on the Council of the Conjoint Conference on behalf of the National Gas Council: Mr. J. H. Cadman, Mr. R. Halkett, Mr. J. Jamieson, Mr. A. W. Smith, Col. H. C. Smith, and Mr. A. E. Sylvester.

A report on the Town and Country Planning Bill had been circulated. Although, broadly speaking, the position of public utility undertakings was well protected under the Bill, the important question of redundant mains was still outstanding, but the Lord Chancellor had stated that subsequent legislation would be forthcoming to deal with this matter.

A report had been circulated, from which it was satisfactory to note that the matter of mains and cables in highways was at last approaching finality, although there were still a few points outstanding which it was proposed to take up with the Highway Associations, and if agreement could not be reached the Ministry proposed to appoint an Arbitrator.

The following representatives were reappointed to serve on the Grand Council of the Federation of British Industries.

(a) *Main Group* 9, *Section* 1 (*Chemical Fertilizers and Explosives*).—Dr. E. V. Evans and Mr. W. Gordon Adam.

(b) *Main Group* 14, *Sub-Group* 3 (*Public Utilities*).—Mr. J. Terrace, Col. H. C. Smith, and Mr. S. S. Ogilvie.

Amendments to the Draft Constitution of the British Tar Confederation which had been submitted by the Association of Coke Oven Tar Producers and the Association of Tar Distillers, respectively, were approved.

It was agreed that the next meeting of the Board should be held on Dec. 12, at 1.30 p.m.

Building Contracts

The necessity for accurate plotting of gas supplies before the contractor is on the site, and the selection of specialist sub-contractors for heating and ventilating, are among the subjects discussed in a 72-page report of the Central Committee for Works and Buildings, just published by the Ministry of Works under the title of *The Placing and Management of Building Contracts* (H.M.Stationery Office, 1s.). The report deals with the internal problems of the building industry, and emphasizes the importance of the parts that must be played by the Government and building owners in providing better conditions for building than those which prevailed in the inter-war period if the industry is to become fully efficient. It is based on seven technical papers, printed as appendices, setting out the problems that arise in the placing and managing of contracts, and its recommendations are under three main headings—those to the Government, to building owners, and to the building industry. The Government alone can deal with those financial and economic problems that made conditions so bad after the last war, and the report urges the fundamental importance of preventing excessive prices, of securing stable economic conditions, and of preventing the disastrous booms and slumps and unemployment which occurred after the last war. Building owners are urged to co-operate with architects in seeing that drawings, specifications, and bills of quantities, as well as a time and progress schedule, are completed on all large contracts before work begins on the site. Another important recommendation is that building owners should abolish the custom of allowing all builders indiscriminately to tender for a particular job, a custom which tends to place the work in the hands of those builders who adopt the lowest standards, and therefore constantly to lower the standards throughout the industry. Selection of a contractor should be made as the result of tenders from a limited and carefully selected list of builders who are judged capable of carrying out the particular contract to the required standard. Sub-contractors should, as far as possible, be selected in the same way. The report defines for the first time the best methods of selection and appointment of each of the many different types of sub-contractors. Any to be nominated by the architect for work affecting progress must be selected well in advance of the signing of the main contract, the main contract must include full particulars of their work, and when the work begins on the site they should be responsible solely to the general contractor.

Science and Agriculture

Under the title of *A Scientific Policy for British Agriculture*, the Parliamentary and Scientific Committee has issued a report recommending an annual expenditure of at least £3,000,000 on agricultural research, as against the £600,000 a year that was spent before the war. Bearing in mind the developments which have already taken place in the use of coke, and the progress now being made in the application of gas to agriculture, it is of interest to note that the Committee suggests that practical farmers, landowners, and industries directly or indirectly concerned with agriculture should co-operate more in an increased research programme. The whole burden of research and its responsibilities need not be laid on agriculture, since other industries with special interests in agriculture might be expected to co-operate on certain aspects. As an example, the report mentions the work of the Electrical Research Association, acting on behalf of the electrical industry and of the Department of Scientific and Industrial Research, on problems raised by the application of electricity to agriculture and horticulture. Recalling its own earlier report on coal utilization, the Committee suggests that research might usefully be undertaken by bodies not primarily concerned with agriculture into methods by which, directly or indirectly, coal could be utilized more effectively for soil heating, crop drying, &c.

It is urged that results of research should be disseminated to farmers, together with scientific knowledge generally, by publicity of every kind. This should include demonstrations, meetings, classes, films, displays, and regional advisory services. Other recommendations are that better drainage and power supply, as well as improvement of soil fertility by the provision of lime, fertilizers, &c., should continue to be pressed forward, that modernization of farm buildings and equipment should receive urgent attention, and that water supplies, not only to buildings, but to fields, should be improved.

Middlesbrough's Model Kitchen

The Middlesbrough Gas Department has erected a model kitchen n the showrooms. The kitchen was assembled at the works as long as 18 months ago, but it was felt that the time was not opportune for its exhibition until nearer the end of hostilities.

The kitchen was opened by the Mayoress, who was accompanied by the Mayor (Councillor R. R. Kitching, who is the principal of a leading firm of Architects, and is also the Chairman of the Housing Committee), and members of the Town Council.

In the first week after it was opened the kitchen was visited by nearly 6,000 people, and the design and appliances have been widely praised. Arrangements are being made for special days for visits by parties of school-children accompanied by their teachers by arrangement with the Education Authority, and also by the various Women's Organizations.

Attractive prizes (First Prize £10, Second Prize £5, and five prizes of £1) are being offered for the best suggestions for improvements.

The co-operation of the Parks Superintendent was secured to provide a grass lawn and flower bed on the exterior of the kitchen, which is visible from the street through the showroom windows. The exhibition is rendered live and complete by well-stocked store cupboards of groceries, &c. The oven contains a large sirloin of beef and the frying-pan contains bacon and eggs, with a slice of fish under the grill. The refrigerator contains bottles of milk, butter, and a roast chicken, and the vegetable rack cauliflowers, carrots, &c. All these are of papier-mache, but very realistic.

Research in Industry

Commenting on the recent Institution Paper by Dr. J. G. King, Director of the Gas Research Board ("JOURNAL" of June 21), Emeritus Professor **J. W. Cobb** (Leeds) stated: The formation of committees and the formulation of schemes for the development of industry along the best lines discoverable is proceeding rapidly and is a hopeful sign, but the successful application of schemes to the requirements of practice is of necessity a slower and more uncertain process, demanding as it does a combination of knowledge, imagination and judgment not always forthcoming. When the development projected is that of research, peculiar difficulties arise, inherent in the subject-matter, from the great extent to which real achievement in research is of necessity the outcome of the independent thought and action of the individual (or a few intimate collaborators), so that the invariable and unfortunate result of any strict regimentation is a fatal decline in quality and usefulness. On the other hand the co-ordination of research effort in an industry, with all that it involves in the way of mutual assistance and the dissemination of information to the greatest extent practicable, is plainly very desirable, particularly when the long view is taken as to what research should be undertaken in the interest of the industry as a whole and the community it serves, especially research going beyond the laboratory scale. To make such co-ordination effective with a degree and kind of control which will secure the best possible use of resources—personal, material, and financial—is no easy task, and its complexity may be gauged from the excellent and comprehensive survey presented by Dr. King in his "Research in Industry"—in this case the Gas Industry. Both a wide and generous outlook and a stern determination to avoid temptation to a dissipation of resources in the laudable desire to be all-inclusive are evidently required to meet the needs and opportunities which emerge. In one important respect the Gas Industry may hope to reap the reward of its foresight. There is now a consensus of opinion in recognizing the part which the Universities ought to play in scientific and technical training and in research for the development of our industries, but this is no new thing for the Gas Industry or the University of Leeds.

The Department of Coal Gas and Fuel Industries was established at Leeds as far back as 1907, owing largely to the efforts of that far-seeing pioneer the late Professor Arthur Smithells, and the Livesey Professorship a few years later with the help of an endowment raised by the Gas Industry as a memorial to a great leader. In that Department training for gas engineering has always had pride of place, a tradition firmly maintained by its present Head, Professor Townend. Moreover almost from the first, association of The Institution of Gas Engineers and the University for the purpose of research was effected through a Joint Research Committee which has functioned practically without a break since 1907, steadily increasing its activities and staff, but never with more promise in its work than now. The experience derived from and by this nuclear organization over so long a term of years should stand the Industry in good stead in the developments, adumbrated by Dr. King, which lie ahead.

Dr. **J. G. King**, in reply, thanked Professor Cobb for his appreciation of the complexity of the problem and of the steps which were being taken to overcome the many difficulties. Professor Cobb, he added, evidently understood the necessity for real determination in achieving essentials and avoiding dissipation of energy.

Lunch-Time Cookery Demonstrations arranged in co-operation with the Ministry of Food were given in the women's canteen of Messrs. R. A. Lister & Co., Ltd., at Dursley, on Nov. 7, 8, and 9. The Dursley Gas Light and Coke Company loaned and installed free of charge a Radiation N.F.T.T. cooker for use at the demonstrations, which were well attended and fully appreciated.

The Gas Supply Company, Ltd., of Melbourne, has declared a dividend at the rate of 4% for the half-year to June 30, 1944, making 4% for the year, as compared with 3½% for the previous twelve months. Profits for the year were £13,823, against £12,371. The Directors report that although great difficulty was experienced in securing coal during the year, a full supply of gas was maintained at all branches. Owing chiefly to the demands of the Services at many branches, the sales of gas increased by 17% over the previous year.

Aspects of Science in the Gas Industry*

By R. F. TWIST, South Metropolitan Gas Company

I HOPE to be able to show you that design and operation in the Industry have been moving steadily forward under the influence of applied science, and that further progress calls for a scientific training and outlook on the part of those engaged in technical matters. In the examples I have chosen I shall mention some matters which are familiar to many of the older people here. I make no apology for that. I am speaking primarily to the younger people, and I should like them to feel—as I do—that the Gas Industry is making more and more demands upon their scientific ability, that we in the Industry are working to finer limits than every before, and that there is an intense interest to be found in doing a job with a thorough knowledge and understanding of what happens at each stage.

During the twenty years I have been in the Gas Industry I have been impressed by the way with which one rule-of-thumb after another has given way to scientific method. Let me give you a few examples. The rule for calculating the cross-sectional area of a retort house chimney was to allow 1½ sq. in. of area per lineal foot run of retorts in all settings dependent on the chimney. The only modification allowed in the calculation was a reduction to 75% of this area with large units of through settings, but a warning was issued that it was unwise to connect a chimney to more than 10 settings. No reference was made to the volume of waste gases passing up the chimney or to the temperature of the gas. The rule at that time did not even recognize the different requirements of recuperative and non-recuperative settings. Nowadays, all these factors would be taken into account, and a calculation would be made on the knowledge that part of the draught created by a chimney of a certain height is used in overcoming the friction of the gases travelling up it, and that with a wide diameter chimney a much greater gas velocity can be permitted (to a calculable extent) than with a small diameter chimney. The remainder of the draught—*i.e.*, that not used in overcoming friction or in discharging the gases at a definite velocity at the top—is available for operating the settings.

I should not like you to think that I am poking fun at this old rule. I found it useful myself 20 years ago, but better information is available now. Scientific treatment has made an advance possible. I should perhaps mention, in case any doubt exists as to the value of this advance, that I know of a case where two chimneys were erected, many years ago, on the basis of this rule, to serve a bench of twenty settings. As they were connected to a common flue at the bottom they failed to work in tandem, and when one chimney was blanked off it was found that the other dealt easily with the whole of the gas.

The removal of ammonia from gas was another matter subject to rule of thumb, and one which gave a good deal of trouble to gas engineers. Nobody really understood how large to make tower scrubbers, and the ratio of diameter to height was the subject of frequent discussion. Judging by some of the towers still in existence, those responsible had decided to make the towers of larger diameter than the rules indicated, to be on the safe side. Actually, the situation was made worse by such a step. It was impossible to irrigate the packing satisfactorily with the small volume of water which had to be used if strong liquor was to be made. Some towers now in use would give a better performance if the diameter were reduced to even one-third of the present figure. We now know that the Gas Industry was dealing with a difficult problem—more difficult perhaps than it realized—that the temperature in the scrubber matters enormously, that the carbon dioxide and hydrogen sulphide in the gas play an important part, and that the situation is complicated still further by the fact that carbon dioxide in the gas takes a much longer time to attain equilibrium with the water than do hydrogen sulphide and ammonia. We also know that tower scrubbers are not really suitable for the removal of ammonia because of the difficulty of ensuring even distribution over the packing of the small quantity of water required, and that multi-stage washers are preferable. I shall, however, refer to the matter of tower scrubbers later.

About 10 years ago a very great advance in the treatment of gas washing problems was made in two Papers published by Hollings and Silver (*Trans. Inst. Chem. Engrs.*, 1934). Their work cannot be summarized here, but it may be said that they have put the washing of gas on a mathematical basis. It is now possible to calculate the size of a tower scrubber or a multi-stage washer required for any given duty, provided information is available on the solubility in the washing liquid of the constituent to be removed, and provided also that certain characteristics of the tower or washer are known. A knowledge of this matter should be one of the tools which a technical man has at his disposal; it is of help in all cases where gases are washed by liquids, whether the constituent to be removed is ammonia, hydrogen sulphide, benzole, or naphthalene. The treatment of the subject is within the abilities of anyone with a knowledge of Inter.B.Sc. mathematics, and the two Papers well deserve study by all who wish to understand the principles of gas washing.

It would take too long to deal in detail with other advances which have been made in such matters as naphthalene removal, the condensing of gas, the removal of tar fog, and the cooling of water. I will say only that the persistent application of scientific thought by the technical staffs of the Gas Industry and of contractors has made it possible either to perform the same duties with smaller plant or with less cost or with better control than was possible a few years ago. The development in plant for benzole recovery, for example, in the last eight years is remarkable, and is still going on. I would hesitate to say that we have reached finality in any of these matters.

We do not have the satisfaction of scrapping old plant and erecting new as frequently as we should like, and so I will now give some attention to situations which are arising every day.

To a greater extent than ever before, the plant we use on the works or the appliance we install in a factory is operated on the basis of results obtained by tests. The man in control is satisfied or dissatisfied on the strength of a figure given to him by a tester, and one of our difficulties is that it is often very easy to obtain a figure which looks right but which may be wrong. Wrong information is sometimes worse than no information at all, because it may give the user a false sense of security in which he allows the undesirable conditions to persist. If he had no information, there is the possibility, at any rate, that he would do something about it.

One of the points I wish to emphasize is that a test may be faulty before the analytical stage is actually reached. Let us take the case of the sampling of flue gases from an industrial appliance, a retort setting or a boiler setting. It is very easy to insert a sampling tube through a convenient hole, take a sample of gas and analyze it. It is very much more difficult to be certain that the sample taken truly represents the bulk of the gases in the flue, or that the operating conditions have not been affected by the action of sampling. Air leaks near the sampling point are a common source of error, and stratification of the gas in the flue leads to many difficulties. Sometimes the solution of the problem is unobtainable. Furnaces are sometimes designed in which a number of streams of gas and air are led to rows of ports in a chamber where combustion takes place, the products then passing away in parallel streams. If no precautions have been taken to ensure that the correct quantities of gas and air are supplied to each port in the row, some of the streams will be "airy" and some "gassy," although a sample of the mixture taken at a point where all the waste gas is passing along a common flue may be satisfactory. These are obvious matters to those of us who have had a fair amount of experience, but I am speaking primarily to the comparative newcomers in the Industry—people who are in the position I was several years ago when these matter were new to me.

This matter of sampling reminds me that most chemists in gas-works have had the experience of seeing a district representative of the Coke Department arrive with a small paper bag containing half a dozen pieces of coke and hearing the remark, "One of our consumers complains that there was too much ash in his last delivery. Would you mind letting me know the ash content of this sample?" Before the errors in sampling were realized, the chemist would determine the ash content and report it to the first decimal point. Nowadays the chemist should point out that it is most unlikely that such a sample would be representative, and that it requires a good deal of care to sample coke. Having been through this stage, I know the usual reply is, "Well, I expect you are right, but I should be glad if you would analyze the sample any way; I must have something to tell the consumer." In my Company the remark has been made that instead of having a young boy to take coke samples and a Bachelor of Science to analyze them, the order should be reversed.

The sampling of solid fuels never has been easy, but in the last 20 years a very great advance has been made, the old methods having been abandoned and the matter put on a new and mathematical basis. Many difficulties remain, but we know to-day what most of them are. Previously some of them were unsuspected. The present method is based on the work mainly of two scientists, Grumell and Dunningham, who have put forward the concept of "variability" in the sampling of heterogeneous solids such as coke, coal, spent oxide, clinker, or pitch. A heap of coke, for example, consists of pieces of various ash contents ranging from perhaps 3% in the case of a piece of good coke to 100% in the case of a piece of shale. If 100 shovelfuls of coke were taken from each heap, crushed, and analyzed for ash content, a fairly wide range of results would be obtained. Some would be high, due to the chance inclusion of several pieces of shale in the shovelful; some would be low because of the absence of shale. It is probable, however, that the average of all the results would be reasonably near to the true ash content of the coke in the heap. If we find the average difference between the ash content of each shovelful and the true ash content, we have a measure of the "variability" of the material—*i.e.*, the extent to which the ash content of any single shovelful is likely to differ from the true ash content of the heap. This variability is likely to be larger with coke of a high ash content than of a low ash content, because high ash content coke usually has an appreciable proportion of shale, and the possiiblities of the chance inclusion of several pieces of shale in a single shovelful are greater. Similarly, the variability is likely to be larger with a heap composed of large coke and breeze than with

* Presidential Address to the London and Southern District Junior Gas Association.

a heap of small-sized coke, uniformly graded. It is easy to see that the larger the variability, the more shovelfuls are required to give a composite sample for analysis. Also the larger the pieces in the heap, the larger should each shovelful be. With the help of many chemists in the coal, gas, and coke industries—who have made thousands of tests—the variabilities of coal and coke of different ash contents and different sizes have been found, and clear recommendations have been drawn up, in simple language, for the sampling of these materials. The results of this work have been embodied in British Standards Specifications Nos. 735 (1944) and 1,017 (1942), both of which deal with the sampling of coal and coke, and everybody who is concerned to know the quality of the material he uses should be familiar with these publications. Even now, the matter of sampling solids is still very often a problem, because it may be extremely difficult to take the requisite number of shovelfuls without bias. So often, for example, segregation occurs with mixtures of large and small pieces, and the effect of this may be superimposed on the laws of pure

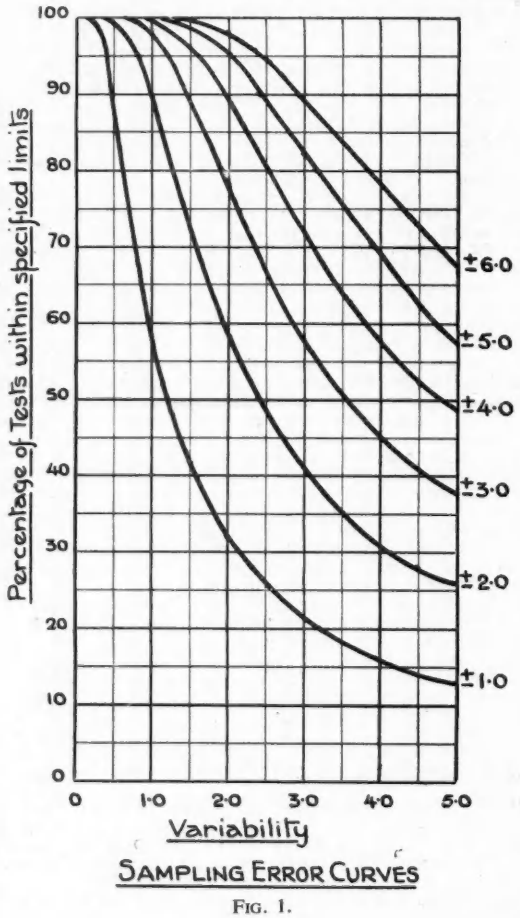

FIG. 1.

chance, which only should operate in the taking of samples. Every case of sampling requires very careful consideration by someone who is aware from experience of the ease with which segregation can occur and of the extent to which it can lead to inaccuracy.

Some interesting consequences follow from the application of this study of sampling. It is possible to plot a series of curves which show, for any variability, the chances of a single increment (which is a general term for a shovelful or any other small quantity) being representative of the whole heap within a given margin of error (fig. 1). The use of this series of curves can be shown by the following example: If coke is being sold in 14 lb. bags, as is sometimes the case, and the variability of the ash content of the 14 lb. increments is 2.0, then the curves show that the coke in 22 bags out of every hundred will have an ash content differing by 3% or more from the average ash content of all the coke. Suppose the average ash content is 10%; then eleven bags of coke will have an ash content of 13% or more. If we know from experience that 13% or more of ash leads to trouble on appliances, we conclude that eleven customers out of every hundred will have some reason for complaining. Admittedly, another 11% of the customers will receive coke containing 7% or less of ash, but that will not appease the dissatisfied customers. In fact, it may make the situation worse, as a customer who has enjoyed the advantages of coke low in ash may complain when given coke of normal ash content.

Another point which arises out of the work on sampling is worth noting. If we wish to find the ash content of 1 cwt. of coal to within ±0.5%, and the size of the coal is 2 in. or over, then, generally speaking, we must either take the whole of the 1 cwt. as the sample, or we must crush the whole of the heap to a smaller size before sampling, which may not be permissible in the circumstances.

One last point: whether we wish to sample 10 tons of coal or 100,000 tons of coal, the size and number of individual shovelfuls required are the same provided that both quantities of coal are of the same ash content and size.

It is of interest to note that in spite of the sound theoretical basis of this method of sampling and the enormous amount of practical work which has supported and justified it, some technical books published recently give the old and unsatisfactory "rules-of-thumb" for sampling and do not even refer to the new method.

Before leaving this subject of testing, I should like to say a few words about the taking of temperatures. Industrial plant sometimes is supplied by makers with built-in temperature recorders, and the temptation is great to assume that the reading shown by the pointer really represents the conditions in the plant. I remember some tests which were made on a waste heat boiler fitted with thermocouples sheathed in stout heat-resisting metal sleeves at the inlet and outlet gas boxes. The inlet reading was about 50°C. lower than the actual temperature of the gas because the sheath was losing heat by radiation to the colder tube plate of the boiler. The correct temperature was found by the use of a suction pyrometer, in which the hot gas was drawn at high speed over a shielded thermocouple, thus minimizing errors due to radiation. The outlet reading also was in error because the sheath was not in the main stream of the waste gas, but was being cooled by the air pulled in through leaks round some of the cleaning plugs in the outside of the gas box.

If anybody is really interested in the measurement of temperature and the precautions which must be taken if truly accurate readings are to be obtained, I would strongly recommend a recent publication, No. 1,041 of the British Standards Institution. This is a most valuable booklet, and can be obtained for 10s. 6d.

Very often the best contribution that science can make towards efficient working is to ensure that every part of the plant is performing its proper share of the work. Apart from the introduction of entirely new processes, I think that this is a line along which much progress is still required, although much has already been done. The ideal situation exists when every cubic foot of gas, every square foot of surface, every gallon of liquid circulated, every pound of steam is doing its fair share of the work. This is occasionally a matter of control, but much more often of design, and a little thought and small scale testing before building the full scale plant will often enable improvements to be effected. Examples may help to make this clear. Some years ago a firm of contractors erected a multi-bay gas washing plant which was provided with a standard type of packing irrigated with liquid delivered usually from a reciprocating pump. The spray nozzle used was of the type where the jet of liquid impinged on a number of concentric plates, giving "umbrellas" of liquid, one within the other. On the plant in question, however, centrifugal pumps were used instead of reciprocating pumps, and it was realized that the irrigation of the packing would be less satisfactory under these conditions for the following reason: With a reciprocating pump, the rate of delivery of the liquid is not constant, and with the varying rate, the umbrellas open and shut, so to speak, and in this way cover the top of the packing fairly effectively. With a centrifugal pump the umbrellas remain stationary, with the result that some annuli of the packing are flooded with oil while others are starved. Accordingly, some experiments were carried out in which measurements could be made of the amount of liquid falling on each 6 in. square area of the top of the packing, and it was found that a considerable improvement could be made by fitting serrated cylinders to the nozzle to intercept parts of the umbrellas and thus effect some redistribution of the liquid. This is an illustration where a fairly easy experiment followed by a simple modification of design improved the chance of each gallon of liquid and each foot of packing surface making its fair contribution to the washing of the gas.

This example refers to a minor improvement to a washer of a more or less standard type. A more thoroughgoing example of an improvement in gas washing plant is given in Silver's patent No. 487916 for the irrigation of a tower scrubber, in which is described a new and scientific method of distributing the liquid uniformly over the packing. I might mention here that it is not always realized that the ordinary board packing tower is far from efficient, and that in many cases only about 15% of the surface of the packing plays a useful part.

It should not be thought that it is sufficient to achieve good design on paper. Much attention is necessary in the erection of plant, otherwise it may differ appreciably from the blue print which is supposed to represent it. An example of this arose when a still for the refining of benzole was being erected, although the same thing might have happened with a still on a benzole recovery plant or on a concentrated ammonia plant. This still was of the ordinary plate and bubble cap type, and the drawing showed that the design was satisfactory in that the vapour uptakes and the bubble caps were to be machined in such a way that the tops of all slots were at the same level. Actually, however, the plates (which were castings) had warped, and were higher in the centre than at the outside. This would not have mattered very much if the tops of all the uptakes had been machined to the same level, but in fact the tops had been machined to the same

height above the floor of the plate. All this, of course, was unknown when the still was being erected, but because the importance was realized of knowing that each bubble cap was doing its full share of the work, we tested the still during erection. This was done by pouring water into the plate to see if it came level with the top of all the slots at the same time. It did not. When the outer rings of the bubble caps were sealed the central caps were unsealed. Once the defect had been discovered the remedy was clear. The plates were all sent away to be machined properly. Had this simple test not been made the vapours would have passed up the centre of the column (for all the plates suffered from the same defect) and the performance of the still would have been very poor indeed. If the mistake had not been discovered at this stage a very worrying time would have been spent during a period in which benzole would have been pouring into the refinery at the rate of several thousand gallons per day, and in the end it would have been necessary to strip the lagging from the still, take it down section by section, and re-erect it with satisfactory castings. I should, perhaps, add one other point. It does not follow that because the tops of all the slots in the plates of a still are sealed to the same extent, each slot will do the same amount of work. There are several other aspects to be considered. For example, even after the warped plates previously mentioned had been machined again, the greater height of the floor in the centre doubtless caused too small a flow of liquid past the bubble caps there and too great a flow round the sides.

Before going to more general matters, I should like to emphasize that these examples are trivial in comparison with the principle which they illustrate. The examples are things of the past. The principle should be working itself out in all we do in the future. The real point I wish to make is not improvements to washers or stills, but the importance of asking oneself at each stage, "How can I be sure that every little part of this plant or this appliance or this fluid is doing just what I want it to do?" The next question should be,

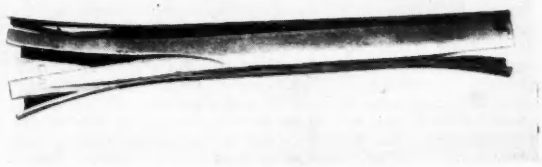

FIG. 2.

"When this plant is put to work, how shall I be able to judge its performance? What tests shall I want to carry out, and how can I make provision for them before the plant is built?" I can assure you that if this attitude of mind can be developed it will prove to be most profitable.

Very much more could be said on this matter of the design and testing of works plant, but time is short, and as I have seen a good deal of the immense value of general laboratory work, I wish to devote some remarks to this branch of science. In a large undertaking the systematic examination of many types of materials, for example, coal, oils, refractories, and purifying material, can result in a saving of several thousands of pounds yearly. I do not wish, however, to labour this point, but rather to give a few examples of an unusual nature which indicate how one may turn with advantage to laboratory work to solve a problem or to avoid a pitfall.

Some time ago, when we were erecting benzole plants, we were rather concerned over possible corrosive effects of the brackish water we should have to use in the tubes of the benzole condensers. We discussed the matter with the makers of special alloys, explaining to them the conditions which would exist on the inside and the outside of the tubes, and they suggested that we should consider two or three alloys for the purpose. Some sample lengths of tubing were sent to us, and as we felt fairly confident about their ability to withstand the brackish water, we began our tests by plugging one end of each tube with a cork, and inserting it in an atmosphere of coal gas and steam containing a little carbon disulphide vapour. In order to keep the tube cool we led tap-water down to the bottom of the tube through a piece of glass tubing and allowed the water to overflow from the upper end. I mention this quite unimportant point to make it clear that at no time was the tube subjected to any greater pressure than 12 in. water gauge. At the end of the first day a small crack was observed in the upper part of the tube. Thinking that this was a flaw, we plugged the crack and continued the test. By the end of the second day two more long cracks had appeared. The test was discontinued and the tube was left on the bench. To our surprise, the original cracks extended and others developed, until after a few weeks the tube was in the state shown in fig. 2. The makers, of course, were called in, and they explained that it was rather difficult to ensure that the whole length of a tube of this material was properly annealed, and that the sample supplied to us must have been in a state of internal stress, and had failed due to inter-crystalline attack by one of the vapours used in the test. They added also that it would be impossible to guarantee complete freedom from this trouble. As we required several thousand feet of tubing for the condensers, we thought that the risk of similar failures was too great and we decided not to use this alloy.

My next example is of an interesting problem with a simple solution which occurred on the district some time ago. It was found that the rubber tubing of a flexible lead failed at the point where it was joined to the metal bayonet fixture of a plug-in connexion. It was thought that the trouble was due to oil or grease being left on the metal part, or to some constituent of the gas or to the use of an inferior quality rubber. The chemist who investigated the problem, however, drew attention to the fact that the metal part had been copper-plated, and that contact with the copper had accelerated the ageing of the rubber, making it st cky and leading to the trouble which had been experienced. Analysis o' the rubber which had been in contact with the metal disclosed the presence of small quantities of copper, which had penetrated into the rubber itself. The chemist who found the cause of the trouble pointed out that the ends of rubber tubing connected to brass nipples in a laboratory age much more rapidly than the rest of the tubing and stick to the nipples, eventually drying and cracking to such an extent that the rubber has to be scraped off. He added that the electrical industry was well aware of the troubles caused by direct contact of rubber with copper, and overcame them by tinning the copper. The same simple remedy was suggested for the plug-in connexions.

Many people engaged on district work have had the problem of finding out if gas has been leaking from mains into the surrounding soil. Sometimes the charge is made that gas leakage has caused the death of trees or shrubs. A gas leak indicator may be of no value in such cases, and the ordinary methods of gas analysis are not sufficiently sensitive. It has been found, however, that if coal gas has passed through the soil it will leave traces of hydrocarbons, which can be detected by sensitive colour tests. If a sample of the soil is warmed while a current of air is passed through it, the hydrocarbons are liberated and can be converted by nitric acid to nitrobodies, which can be detected by the characteristic blue or purple colours they give with caustic potash in a non-aqueous solvent. These hydrocarbons are not normally in the soil, and if their presence is disclosed by this test, there is strong presumptive evidence that gas leakage has occurred. The test is remarkably sensitive, and can be applied even where the gas has been debenzolized by oil washing. It may, however, fail if applied to gas debenzolized by active carbon.

Annealing of Copper Wire

The use of the "top-hat" type of furnace for the annealing of copper wire is well known. Recently a small experimental unit was used by the London Electric Wire Company and Smith's, Ltd., at their works under the supervision of their technical staff for determining approximate working consumptions and efficiencies for this process. The results are of considerable interest, and even better efficiencies can be obtained with larger units.

Number of reels per batch	2
Weight of copper per batch	60 lb.
Heating time	15 min.
Maximum temperature recorded	550°F.
Gas rate per hour	88 cu.ft.
Total gas consumption per batch	22 "
Gas consumption per lb. of wire handled	0.367 cu.ft.
Gas consumption per ton of wire handled (*a*)	821 cu.ft. (480 B.Th.U. per cu.ft.).
Ditto (*b*)	3.94 therms.
Cost of fuel per ton at 6.25d. per therm	24.6d.
*Estimated heating efficiency	28.7%.

* Based upon theoretical heat input required to raise the copper only in each case to the required temperature, using formula $\frac{WST}{GC}$:

Where W = weight of copper handled.
S = specific heat of copper.
T = temperature rise in deg. F.
G = gas consumed in cu.ft.
C = calorific value (B.Th.U. per cu.ft.).

The Eastern Counties Gas Engineers' and Managers' Association will hold its Autumn Meeting at Grosvenor House, Park Lane, W., on Nov. 30, when Dr. F. J. Dent, Joint Assistant Director of the Gas Research Board, will present his Paper on "The Production of Gaseous Hydrocarbons by the Hydrogenation of Coal," and Dr. J. G. King, Director of the Gas Research Board, will give an informal talk on "Research in the Gas Industry." The meeting, over which Mr. W. J. C Garrard (Ipswich) will preside, is timed for 2 o'clock.

The L.C.C. Education Department have considered the recently published Gas Industry's book entitled *Gas. What it is. What it Does*, and have recommended its addition to their list of textbooks for use in all L.C.C schools. The Education Bulletin distributed to their elementary and secondary schools authorizes teachers to order copies through the Education Officer's Department.

The Gas Industry—Four Major Problems

The following is a report of the discussion on the Paper by Mr. G. E. Currier to the Manchester District Association of Gas Engineers—see "JOURNAL" of Oct. 25.

The **President** (Mr. Norman Hudson) said that, as was to be anticipated, Mr. Currier had presented an exhaustive analysis of the present position in the Industry. There had been much loose thinking in former years with regard to the Gas Industry's many problems, and to that extent he agreed with Mr. Currier's outline of the facts. On the other hand, it was not quite correct to blame the Industry for all its apparent difficulties, which were now made clearly visible under the bright light of post-war planning. For instance, Mr. Currier, in his treatment of the coal problem, suggested that with Regional Gas Boards controlling the Industry, it would be easier to obtain the right type of coal and a type which, in the national interests, should be used. Personally, he would suggest that the setting-up of a Consumers' Advisory Board under the coal-selling schemes in 1935 would have achieved that desirable result long ago. The Gas Industry, as well as other consumers, had asked for such a provision to be made, but the Government had failed to give them the necessary access to coal-selling by means of the Consumer Advisory Boards, which was so essential if there was to be a wise use of this national fuel.

With regard to appliances, Mr. Currier had put forward some wise suggestions, and his viewpoint on standardization would probably be supported by many of his hearers. There again, however, the representatives of the gas-making and distributive section of the Industry were placed at a disadvantage in that they could not control the manufacturers of gas appliances. It was to be noticed that there was no system of control provided in Mr. Currier's scheme respecting such people, the suggestion being merely that there should be negotiation. Would there be any improvement on the present position?

The question of research work had been dealt with thoroughly by the speaker, though he arrived at a conclusion with which he, the President, disagreed when it was stated that by means of public ownership and through the medium of Regional Gas Boards there would be more money spent in that direction with an appreciably better result. This seemed to be an assumption which, in fact, could not be substantiated by past history, because there had been a national fuel research station established under the auspices of the Government for many years, and although it had been indicated some years ago that a National Fuel Policy was desirable, there had been nothing done by the Government in regard to this matter. It appeared to be the fact that the Gas Industry generally had not been sufficiently research-minded in the past, but the war had undoubtedly provided a considerable impetus in that respect during recent years. There was now every indication that, with the right men at the helm, research work would now follow a definite line and would be reflective in benefits to the gas consumer.

Another point which required consideration was the "package kitchens" in so far as the matter was associated with the publicity "boost" now being given to the kitchens of post-war houses. Mr. Currier had correctly stated that manufacturers of electrical contrivances were ready with their package kitchens, and that refrigerators, cookers, fires, immersion water-heaters were being included, while the various power points necessary could be easily incorporated. Personally, he did not know of a gas appliance manufacturer who was able to provide the whole of a package kitchen. It was a necessity to be able to provide package kitchens, not merely for new houses, but also in order to modernize old ones on the cessation of hostilities. From the point of view of distributors and sellers of gas such a household unit was eminently desirable, and the various appliance manufacturers should get together on this problem.

Mr. **Charles Cooper** (Messrs. W. C. Holmes & Co., Ltd.) referred to the question of purification, a subject which the President had dealt with at length in his Address at an earlier date. The fact was that the Ministry of Fuel and Power in their wisdom had rightly or wrongly stated that certain improvements in purification were not essential to the pursuance of the war effort. Although the matter had been, as it were, placed in cold storage, nevertheless research work had been going on, and the results which had been obtained were highly interesting. There was no reason why the members of the Association should not be made acquainted with them, even though they might not be able to take advantage of them for some time to come.

Mr. **W. B. Harrison** (Sowerby Bridge) thought there was too much tendency to compromise; there was a lack of outspokenness and clear thinking. Mr. Currier had expressed the opinion that gas was Public Servant No. 1, but personally, he would suggest that the term should be Public Ownership No. 1. Everyone would probably be in agreement with Mr. Currier respecting the testing of coals; even the smaller undertakings were fully aware of what class of coal they required. At the present time the Gas Industry appeared to be the Cinderella of the Ministry of Fuel and Power, and therefore it should make its views heard much more clearly than had been the case in the past.

Dealing with the question of appliances, different undertakings had been selling them at fantastically differing rates, while the comments on meters should certainly evoke an interesting discussion and stimulate manufacturers into taking further action. Personally, he agreed in the main with Mr. Currier's remarks concerning meters, but thought there might be a possibility of development in the use of plastics. One sound statement which had been made in regard to meters was that 100% machinery should be used for their manufacture; this appeared to be an essential policy to pursue.

The reference had been made in the Paper to the cost of metering, and this would seem to be a major problem presenting itself for solution. The cost of reading meters, &c., to the public might be as much as 2d. a therm, and an appropriate charge should be made, whether gas was burned or not. Something further should certainly be done with regard to the purification of gas, particularly with regard to oxide hardening in purifiers.

He did not agree with Mr. Currier concerning public ownership. There had been much loose talk concerning nationalization; it was only one side of the question, and it was not necessary for the Gas Industry to be publicly owned in order to put its house in order.

While he was in substantial agreement with the suggestion of the Post-War Planning Committee of the British Gas Federation that the Gas Industry did require integrating, nothing appeared to be done about it. There had been a spate of papers dealing with the Gas Industry generally, the design of cookers, &c.; but no tangible result appeared to be evolving. Were they sitting back waiting for the Ministry's Committee to advise them what course to pursue? Should they not themselves endeavour to place some concrete proposals before the Ministry? He agreed that action would have to be taken locally, and that there would have to be some degree of compulsion.

In his opinion the Industry should not be publicly owned, though he would like to see committees set up to investigate the various problems requiring investigation, because a considerable amount of money would have to be expended upon the reconstruction work later. Therefore, the sooner suitable schemes were prepared the better.

Mr. **J. E. Lister Cooper** (Yeadon) thought that Mr. Currier was very mild when making his remarks concerning coal supplies, particularly in the paragraph stating: "The introduction of the Coal Selling Schemes in 1935 did not make for freedom of choice of coal for carbonization." As a matter of fact, there had not been any freedom of choice since. Then, again, Mr. Currier thought that, through the Ministry of Fuel and Power, undertakings would obtain more or less what they required, but personally he, the speaker, agreed with the President, and could not be very optimistic on the point. It was to be hoped that Mr. Currier was right.

Dealing with the question of appliances, apparently the Industry was losing its sense of proportion concerning refrigerators. It was assumed every housewife desired a refrigerator, but probably a much more useful appliance would be a larder conditioner, which would be a workman-like job.

Useful comments had been made concerning meter mechanism. He had been somewhat alarmed by the suggestion to construct meters by means of semi-skilled labour, because in his opinion all useful labour was skilful. It was most important that meters should be constructed by means of skilled labour.

Personally he saw no difference between nationalization and public ownership, except that between Tweedledum and Tweedledee, or of anything which was going to place the Industry under the control of a Parliamentary-appointed committee. On the other hand, he was in entire agreement that there was necessity for integration, but he desired it to be carried out by the Industry itself. The only way in which Parliament should enter into the situation should be to institute the compilation which might be necessary in order to effect integration. In the words of the Premier, spoken some few months previously, "We must beware of trying to build a Society where nobody counts for anything except the politicians and the officials; a Society in which enterprise gains no reward and gets no privileges."

Mr. **James Carr** (Stretford) referred first of all to the subject of coal. Mr. Currier had mentioned the committees of investigations, and having attended those committees he, the speaker, found the first questions they asked were for proof of poor quality, poor supply, price being the last consideration. If an undertaking had not preserved a record of its analyses in the laboratory it would be sunk upon going before a Committee of Investigation. Dealing with the question of nationalization or otherwise, was it to be imagined that the man-in-the-street cared whether an organization was referred to as the Stretford Board or the Stretford Gas Company? He would only be concerned with the service he expected to receive.

Mr. **R. Walker** (Manchester) said that in the future there must decidedly be freedom of choice of coal, and the only way to achieve that desirable consummation was to refuse to take unsuitable stuff and also to refuse to pay for it. They were not likely to succeed in this respect by an extension of committees, or even by an extension of the well-meaning efforts of the Ministry of Fuel and Power. A very good case had been made out under the able guidance of Mr. Fletcher and Mr. Shaw, which was based on definite information as

to the deterioration of coal supplies. Was that information to be wasted by being pigeon-holed? It would be unless the Industry and the Association made up their minds not to tolerate the present state of affairs. He was afraid that even the considered reflections of Mr. Currier on the lines indicated in the Paper were not sufficient; in the post-war period there would have to be something in the nature of a revolt. The householder would back them up in their demand for better coal.

Attention should be drawn to a Report published recently by the Solid Fuel Installations Committee of the British Coal Utilization Research Association. It was a 47-page document, and it should give the Industry something to think about. Coke was mentioned at the end of it. A programme had been outlined for coal interests, and it was pointed out that altogether 51 million tons, or 80%, of fuels were used for domestic purposes in solid form. A satisfactory domestic fuel coke should be produced in order that the Industry might retain the rightful place it held before the war.

Mr. **F. G. Shaw** (Buxton), speaking with regard to ownership and integration, wished to draw attention to the conclusions of the Association of the Smaller Municipal Gas Undertakings which had been published in the Press. "In attempting to summarize its views on this most extraordinary problem, the Association submits that the present structure of the Gas Industry should be permitted to continue to function as at present. Experience has shown that integration has been taking place over a very long period of years by mutual consent, and therefore submits that no other system is required to deal with this natural evolution of the industry."

That was the resolution of a body which perhaps more than any other company of men was biased in the direction of public ownership, and it had been published and sent in to the Ministry.

One of the real troubles in regard to integration was provided by the members of the Association. Unfortunately for the advocates of the very large gas-works distributing over large areas, the members of the Association engaged with smaller undertakings were producing figures with regard to both technical efficiency and the price at which they were selling gas which made it difficult for believers in large units to establish their case. There were most efficient smaller undertakings functioning in the area covered by the Association and, in some instances, they must undoubtedly have been a thorn in the side of the large ones. He remembered, in his earlier years, what a great trouble Widnes was to the Lancashire undertakings. He even went to test the gas at Widnes on one occasion.

The fact of the matter was that the Gas Industry was unlike most other industries. Above a certain minimum size the unit of carbonization was the same in the largest works as in one of quite small capacity; if a similar technical scale was brought to bear in operation the obvious result was that there would be no difference in efficiency. The figures of the Gas Engineers' Advisory Board showed that this was not only possible, but that it was actually being done; most remarkable figures, were being obtained in regard to the technical efficiency of operation and also the very important matter of the price of gas to the consumer.

Nothing, of course, was said in regard to the very small country undertaking which probably had to cart its coal many miles from the station, and which was too small to provide a living salary to its unfortunate manager. Such a manager was the man with whom he was most concerned, but it would not pay many undertakings to run a pipe line to such a small works. Only some very broad-minded policy of the regional type would suffice to maintain the present system of ownership.

Integration was actually the greatest obstacle to the splendid work which was being done in the area covered by the Manchester District Association by some of the smaller undertakings producing 100 million cu.ft. of gas or even less. He had one undertaking in mind which produced only 29 millions, and he would like every member of the Association to inspect it. There was another one producing 40 million cu.ft. A very great deal of enterprise and technical knowledge was displayed by the managements.

In his time he had seen the Gas Industry change its main basis of revenue, having entered it at the time when all the lighting was by gas. What was going to take place in the next 30 years? It would seem to be the case that a flexible organization would be the best organization for the trying years which they all knew to be ahead.

Mr. **D. V. Lewis** (Salford) said that in regard to the coal supply question, Mr. Currier did specifically mention horizontal and intermittent chambers as dealing with coal which operators of vertical retorts did not want and were not going to accept. The man in the horizontal house and the chamber house had to sell his coke and to use his coke in the producers; therefore it was not a reasonable proposition that he should be working coal with 10% of ash, whereas the man with the verticals had 8% of ash. There should be an equal distribution.

It was only fair to realize at the outset that most of the meter manufacturers, like gas engineers, had been placed under restrictions owing to the war, or there would probably have been greater developments in meter design.

In regard to integration, had Mr. Currier prepared his Paper prior to the post-war report of the Gas Industry it might have been of more help. It should be not lost sight of that the Gas Industry had considered the post-war situation and had submitted its recommendations to the Ministry of Fuel and Power. They had only had a limited period of time in which to do this. Each region had had to concentrate upon the problem, to elect its committees; those committees, in turn, placed them before the Ministry of Fuel and Power. Therefore, there did not seem to be any point in raising the matter again. The Ministry were now in possession of the conclusions of the Industry; they had gone out to an outside committee, but would also express their views. Apparently the Ministry of Fuel and Power were going to dictate back to the Gas Industry what was to happen, so that the Industry would not have very much more to say now.

With regard to the comments respecting electricity supply equipment, he did not think that all the push came from the C.E.B. Manufacturers concerned with the Gas Industry had certainly been very lacking in bringing to the public notice not models, but some outline of what models would be like in the post-war era. It was easy to publish drawings, and such like, for the public to see, but this had not been done. As far as he could observe, only one instance had been mentioned by Mr. Currier—namely, the Cannon—as an attraction to place before the public.

Much of the capital used in the Industry was in the hands of manufacturers. The manufacturer should be invited to attend committee meetings, and even to sit on committees, in order to express his own point of view as well as contribute Papers for discussion.

Mention had been made of kitchens. There was a galaxy of kitchens in the Industry at the moment; every undertaking had one, either in course of preparation or completed. But there was no stereotyped kitchen; they were all different. Everyone seemed to be trying to provide the public with something different from that produced by others, and this tendency was noticeable also to some extent on the part of the manufacturers, though not on a big scale. It would be good policy to look forward not only to the provision of the new kitchen, but also to the introduction of appliances into houses which already had a kitchen not of modern design.

Mr. **Currier**, in replying to the discussion, said that although there had not been Consumers' Advisory Boards on coal, we now had the Ministry of Fuel and Power, which controlled coal, gas, electricity, and oil. If there was a central Gas Board and Regional Boards they coud speak with a much louder voice regarding coal in all its aspects than could any single undertaking. It was quite correct, as the President had stated, that he had not included the control of appliance manufacturers in the scheme of public ownership, but any scheme of Central and Regional Boards could deal more effectively with manufacturers than could any one gas undertaking.

The President had mentioned research, and referred to the Fuel Research Station. This did not seem to be a good analogy. He did not know how much money was spent on the Fuel Research Station, but in 1941 there was spent by the Gas Research Board roughtly £14,500. That would just pay for a gasholder with a capacity of a quarter of a million cu.ft. It did not seem to be necessary to say any more on that point.

It was interesting to learn from Mr. Cooper about the improvement with regard to purification, and assuming that the Ministry of Fuel and Power gave sanction for the plant, the sooner the Industry was given the results of the new process, the better.

He agreed with Mr. Harrison that the small works might know quite well what kind of coal they required, but that did not mean to say they were going to get it. They would stand a far better chance of being able to get it if they belonged to one large Regional Board which was in a position to tell the Coal Supplies officers, "This is the kind of coal we want for Sowerby Bridge."

Plastics had been tried for meter construction, but at a time when they were relatively undeveloped. There would appear to be, however, a possibility of much further development, and no doubt plastics would have a very good chance of being used in meters.

Everyone present would probably agree with Mr. Harrison's statement that a minimum charge was necessary. Mr. Harrison had said that the Industry should speak with a louder voice, and that it ought to be doing something, and Mr. Dixon, when he spoke in another part of the proceedings, had stated that the Industry was doing far too much talking and too little doing. Mr. Harrison had suggested that the talking should be done by The Institution of Gas Engineers, but their Charter would not allow them to do so.

The larder conditioner had been mentioned as an alternative to the refrigerator. The larder conditioner had become very popular, and he understood the electrical people had a very good model of it. It could be stated that the cost of operation would be fairly high. What it came to was that the larder conditioner cost much less to buy, but was more costly to operate than a refrigerator.

Mr. Carr had mentioned his experience with the Committees of Investigation. Perhaps such Committees were of little use to the gas consumer, but there was now the Ministry of Fuel and Power in being, and it must be the function of the Ministry to allocate suitable coals for gas and electricity and other purposes.

Mr. Carr had said there was not much value in the name of the undertaking, it was the service to the community that mattered; but there would never be the best service to the community with private ownership as it was understood at the present time.

He did not know how far Mr. Walker was going to succeed with his policy of revolt and refusal to take poor coal. At one time it was seriously suggested that the Industry should accept open-cast coal. There was much opposition to the suggestion, with the result that, as far as he was aware, there was no compulsion imposed, so that those looking after the coal supplies to gas undertakings had done some good work.

Mr. Lewis appeared to have misinterpreted the meaning of his

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remarks concerning coal for continuous, vertical, and intermittent retorts; what he desired to make clear was that suitable coal should be used in each, and the time would surely come when all coal would be properly clean, low in ash content, and reasonably low in moisture. He could not agree with Mr. Lewis on the subject of meters. The complaints he had recorded in the Paper concerning meter manufacturers were founded on experience which obtained long before the outbreak of war. It was therefore no excuse to say that the manufacturers had been prevented from effecting improvements owing to the military situation. All they had produced, so far, was a high-capacity meter; and there had been ample opportunity before the war to secure a policy of real co-ordination among meter manufacturers. Mr. Currier reminded Mr. Lewis that in recent years manufacturers had been given representation in some important National Bodies of the Gas Industry and, further, that Sir Frederick West, who was a most important manufacturer, had recently been President of The Institution of Gas Engineers.

Probably they all agreed, first and foremost, it was necessary to reorganize the Gas Industry. In spite of all Mr. Shaw had mentioned about the very efficient 29 million works, manufacture was only one item in the business of a gas undertaking. Having manufactured gas, it had to be distributed, and then it had to be sold. This could only be done efficiently by pooling finances, and small 29 million works could not possess the financial resources of the bigger undertakings.

If there was to be reorganization, then there would have to be some change of ownership, and, at the present time, there were three or four systems of ownership in operation. Was any one of those systems sufficient to bring all the undertakings under one umbrella of a complete, comprehensive system? His answer to the question was an emphatic negative. He had put forward his claim as his considered opinion, and not merely for the purpose of evoking spirited discussion. It was his firm belief that the best course for the Industry to adopt was a scheme of public ownership, though, by this, he did not mean control by public servants or by a Committee of Parliament. What was necessary was control by a Central Board of experts in every phase of the Industry's activities. In his opinion, this was the only solution of the problems confronting the Gas Industry if it was to survive and make progress. The Industry could not remain stationary; it must either recede or advance, and the whole scheme would have to be made compulsory.

Mr. **C. H. Bamber,** in proposing a vote of thanks to Mr. Currier, said it was necessary that the Industry should have its major problems paraded before it periodically, because the general tendency was to shelve consideration of them, and procrastination served no useful purpose. Nevertheless, Mr. Currier did not appear to have presented four major problems, merely one—research. Every one of his four problems, as outlined in the Paper, ultimately resolved themselves into a matter of research in regard to coal supplies and methods of securing the right kinds of coal. He did not, personally, agree with the statement that every undertaking knew what sort of coal it required. An undertaking might know what kind of coal it required to-day, but it did not know what would be necessary ten years hence. There might be revolutionary developments in the methods of gas manufacture, and there was certainly a very considerable field of research presented by the type of coke as now supplied, and which was hoped to be supplied in the future, for large-scale domestic consumption.

Mr. **H. Singleton** (Huddersfield) seconded the vote of thanks. Mr. Currier had stated that the Ministry of Fuel and Power could be reasonably expected to ensure that gas undertakings should have freedom of choice of coal purchased for carbonization. If the august body which at present allocated coal to the Industry was to be regarded as a sort of forerunner of what a Committee of the Ministry of Fuel and Power was going to be, the outlook would not appear to be very bright. Personally, he had little confidence in committees appointed to select coal; he would rather choose his own. The standardization of appliances was a vexed question, but a report had been published, which standardized the procedure by which gas should be laid on to premises. This was a first step forward, and would be welcomed by the Industry as making for standardized conditions in regard to appliances.

Keen Interest was shown last month by the public in the kitchen equipment display by the Stretford and District Gas Board at a "When We Build Again" exhibition staged in the Board's showrooms.

Gas Consolidation, Ltd., have declared an interim dividend of 2½% actual, less tax, on the "A" Ordinary Stock, and an interim dividend of 2% actual, less tax, on the "B" Ordinary Stock, on account of the year ending May 31, 1945, both payable Dec. 1, 1944 (same).

A **Meeting** of the London and Southern District Junior Gas Association will be held at Gas Industry House on Friday next at 6.30 p.m., when Mr. J. E. Davis, of the South Metropolitan Gas Company, will give an Address on the subject of "Evolution in Fuel Supply."

A **Celebration** has been held at the Works Canteen of Messrs. George Wilson Gas Meters, Ltd., on the occasion of the Stand Down order for Civil Defence Services. There were 140 persons present, which also included members of the Home Guard, and also the A.R.P. and Civil Defence Services of the firm. Presentations on behalf of the firm and of the staff and employees were made to the A.R.P. Controller, Mr. G. W. Toman, who had been responsible since 1938 for all arrangements. A presentation was also made to Mr. Styles, his deputy. After a dinner, the assembly were entertained by a local concert party, and the evening concluded with a dance.

Fuel Saving in Varnish Manufacture

The operation of melting gum in a varnish pot and its subsequent bodying with linseed oil and thinning is one of those industrial processes in which the fuel cost is small in relation to the value of the product. High fuel consumption is often tolerated for this very reason. The annual cost of the fuel that can be saved is always sufficient to make economy worth while.

The thermal efficiency in making varnish has hitherto been low because of the conditions demanded by the manufacturer. To obtain high output rapid heating is necessary, and this involves a high heating intensity in a restricted consumption space; the products of combustion escape at a high temperature and the losses are consequently rather high. The varnish maker, moreover, is so accustomed to working with a pot of standard size holding some 80–84 lb. of hard gum that he does not wish to depart from it. Consequently the opportunity of increasing heating efficiency by modification of the area of the heating surface is ruled out.

The varnish maker's requirements may be stated as (1) rapid heating to obtain high output from the plant and labour employed, (2) control of the gas consumption for heating to permit close temperature control, (3) low thermal capacity of the pot and furnace to prevent over-shooting the temperature at critical periods in the manufacturing operations, (4) a soft flame to increase the life of the pots by preventing local over-heating, and (5) avoidance of noise in the burner to allow quietness of running.

Two methods are in general use for obtaining the required conditions of heating. One of these is to produce an incandescent bed of refractory material by means of high pressure gas, or gas and air blast burners, the flames impinging on the refractory material, which then heats the pot base by radiation. This method is technically satisfactory, but the gas is not used with a very high efficiency. The other method, less frequently used, is the direct impingement of high intensity flames on the pot bottom. When speed is important, the forcing of the flames may set up hot spots which may burn the pot, or in extreme conditions carbonize the gum at the points of impingement.

A new design of varnish hole has lately been introduced which, while fulfilling all the requirements just described, uses the gas with markedly higher efficiency than the older methods and thus reduces the costs of varnish making. Economies of at least 10% have been found in practice with the new furnace.

This new furnace consists of a large single burner of the nozzle-mixing type, using air at low pressures of 4 in. to 8 in. W.G. The flame is projected on to a trumpet-shaped well, which rapidly attains a high temperature. The bottom of the pot is heated by radiation from the high temperature surfaces and from the products of combustion. The higher the temperature of the surfaces and of the gases the more rapid is the rate of heat transmission. This temperature is materially increased by pre-heating the air used for combustion. The use of pre-heated air is a new development in varnish pot heating, and the value of the new design lies in the saving of heat directly by utilizing the heat in the flue gases that would otherwise have been wasted, for heating the incoming combustion air, and indirectly in the greater rapidity of the heating due to the higher furnace temperature.

The combustion chamber is moulded *in situ* with special plastic material of high refractoriness to a shape having rather critical dimensions. The rest of the brickwork is for the most part composed of high temperature insulating bricks.

An example of a typical run is as follows:

Number of heats		15.
Average time to first oil		30.6 mins. per heat.
„ amount of gas used to first oil		1.033 therms per heat.
„ rate of gas consumption		2.025 „ „ hour.
„ time to finish		7 min. per heat.
„ amount of gas to "finish"		0.228 therms per heat.
Total amount of gas used during the day		19.4 „
„ gas used per heat		1.293 „

Midland Juniors

A visit of the Midland Junior Gas Association was made to Derby on Nov. 4, when members were received at the Gas Offices by Mr. A. W. Elliott (Engineer) and Mr. Thomas Smith (Distribution Superintendent), of the Derby Gas Light and Coke Company. In the Industrial Department the party inspected the installation of heat treatment equipment under the guidance of Mr. A. C. Jennings (Industrial Gas Engineer). The plant comprises 14 types of furnace, Brinell hardness testing machine, and Firth hardometer.

Afterwards the kitchen of Messrs. Longdon & Co., whose premises adjoin those of the Gas Company, were inspected. This kitchen, which is used for preparing meals for the employees of the firm, was designed and equipped by the Derby Gas Light and Coke Company, and is one of which they are justly proud.

Adjourning to the Offices of the Gas Company, an ordinary general meeting of the Association was held, with Mr. F. J. Bengough (President) in the chair.

A short Paper entitled "Statistical Aids to Gas Sales" was read by Mr. Thomas Smith. This was followed by a discussion.

The party then adjourned for tea at the invitation of the Directors of the Gas Company.

The President of the Association, proposed a vote of thanks for the facilities given for the visit, and also for the hospitality which had been enjoyed.